

XXIX.—*On the Preservation of Objects of Natural History for the Microscope.* By WILLIAM RECKITT, M.R.C.S.L.

To R. Taylor, Esq.

DEAR SIR,

HAVING read in the present Number (February) of the 'Annals' a paper by the Rev. M. J. Berkeley on the mode of mounting objects of natural history for the microscope, I am induced to offer for your perusal a few remarks on the same subject, and to suggest to you what appears to me a surer and a better plan. For the last few years I have been engaged in microscopical investigations, during which time I have frequently had occasion to regret that many of my best preparations were rendered entirely useless by preservation in balsam of Canada, the only method of mounting with which I was acquainted, which was entirely unfitted for exhibiting the structure of vegetable tissues, as well as the delicate parts of insects, frequently converting them into a confused hyaline mass, in which nothing of their structure was recognisable.

In the spring of last year I requested the publication of a few remarks on the best mode of mounting in the 'Annals,' which was answered obligingly by the appearance of a paper on the subject by Dr. J. W. Griffith. Consequently I set to work on the plan proposed by that gentleman, but was much disappointed at the length of time which was necessary to allow them to dry. I then made a variety of experiments to invent a varnish which would present the two grand desiderata of perfect fluidity, allowing it to be easily applied, together with the property of drying quickly. All my endeavours to succeed in this would I believe have failed, had I not in my inquiries luckily stumbled on a drunken painter, who suggested the employment of old black japan. This, which can be obtained at any painter's, I have used ever since, and found to answer every expectation. It is absolutely necessary that it should be old to ensure it drying speedily.

The object should be mounted in a cell in the way described by the Rev. M. J. Berkeley, however minute it may be, as it prevents the varnish from insinuating itself between the upper and lower glasses; the fluid should be soaked up to the margin of the top glass by a small piece of blotting-paper, and then a very thin delicate coating of black japan is to be applied with a fine camel-hair pencil; this will be perfectly dry on exposure to the atmosphere in twenty-four hours, when another coating rather thicker is to be applied, and on the third day another, which should have two days allowed for it to dry in, when the slider may be papered. I usually make a number of cells of different sizes at a time.

These are made by merely painting the glass slider with a thin coating of varnish so as to leave an empty clear space of the size desired. These will be ready for use in twenty-four hours. If time is an object, they may be placed on the fire "hob," and in a quarter of an hour your cell will be ready for use. If a thick cell be required, a second or third coating should be applied: it is far better to make deep cells by three or four coatings, letting the preceding one be quite dry, than to form it at once by a single thick application of the varnish. And now with regard to the fluid for preserving the objects in, Mr. Berkeley and Dr. Griffith recommend Goadby's solution. This does very well for animal substances, but is totally inadmissible, so far as my experience goes, in a very great number of vegetables. The endochrome of the *Zygnema* is coagulated by it, and the beautiful spiral in the interior of the cell is destroyed, and the same has been the case in other delicate confervoids where I have tried it; in place of the bright green in many of these, they have presented a dull leaden appearance. Pollen tubes mounted in it are invariably spoiled. This obtains equally where spirit of wine is made use of, even though used in a very dilute state; it has also the additional disadvantage of corrugating and making opaque.

The fluid I make use of is simply cold water; perhaps it would be better if previously boiled and allowed to stand for a short time: filtering in my opinion should never be had recourse to with any fluid used for microscopical purposes, as the liquid in passing through the bibulous paper will always carry with it small flocci from the paper, and the presence of these materially interfere with the beauty and perfection of the object to be viewed. When the object is varnished down and all contact with the atmosphere is cut off, it is impossible that decomposition can take place. In the case of *marine* Algæ I make use of salt water which has been allowed to stand for some little time in order that all the impurities may subside. Many hundred objects have been mounted by me in the manner described, which are as perfect in every respect as they were on the day in which they were first prepared, in shape, colour, &c.: probably the most delicate preparation I possess is a slider of the cells of the anther of *Chara hispida*, in which the spermatozoa are beautifully shown, some in the cells, others in the act of quitting the cell, and some spread over the surface of the glass in the cell. Now if decomposition did take place in this method of mounting, it would doubtless have attacked and destroyed long before this these delicate little animalecules, animal matter being much more liable to the destructive process, *cæteris paribus*, than vegetable. Many months have elapsed since they were mounted (in May last).

Every working microscopist examines with the object immersed

in a drop of water and covered with a top glass. Now it is a very great advantage to be able at once to mount anything without being obliged to shift the top glass in order to introduce a different fluid; in doing this the relative positions of parts are frequently changed, or in the case of animalcules the latter may be lost, and many a rare thing have I irrecoverably been deprived of by having recourse to a different fluid before I was led to adopt my present mode. If any person could discover a method of mounting marine Algæ so as to prevent the loss of the beautiful tints in many of the more delicate, he would confer a great boon on microscopists. I regret to say that every method of preserving colour in the *Griffithsia*, the *Calithamnia* and *Ceramia* have with me signally failed; their delicate rose-coloured tints are soon lost, even though the cell is allowed to dry and the preparation ever afterwards kept in a dark place.

Inclosed I forward to you a cell, also a slider containing a portion of *Batrachospermum vagum* according to Sowerby, but in my humble opinion a variety only of *B. moniliforme*, together with the spiral vessels of the garden Nasturtium. These are all prepared in the manner detailed above, have been mounted nearly a year, and have suffered no change during this time.

I have the honour to be, Sir, your obedient servant,

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Boston, Lincolnshire.

XXX.—On the genera *Eleutheria* and *Synhydra*. By P. J. VAN BENEDEN, Professor at the University of Louvain*.

IN order that physiological researches may extend the state of our knowledge in zoology, it is requisite that the limits of the genera and species composing the scale of beings should be well determined. The object of the naturalist should be to become acquainted with the animal in the different phases of its development. A celebrated professor has said, that we do not know a species, if we have not studied it from its exit from the egg up to the period of its decrepitude.

M. de Quatrefages has communicated to the French Academy of Sciences, a memoir on a new animal which he has called *Eleutheria*. While our work on the *Tubulariæ* was in the press, we received this memoir†, and we could not but express a doubt of the zoological value of this new genus. It might indeed be a young animal, we said, which in the adult state would come to

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† Annales des Sciences Naturelles, 2nd series, tom. xviii. p. 270.